KANSAS CLIMATE SUMMARY AND DROUGHT REPORT
Current Conditions, Drought Impacts and Outlook

October 2009

Near Record Chill Highlights October

October 2009 goes into the record books as the second coldest October in the state's 115-year (1895-2009) climate record. The statewide average temperature of 48.4^{0}F was 7.8 degrees below normal. October was the fourth consecutive cooler than normal month. Since April 2009, only June has been warmer than normal.

Nearly the entire state averaged at least 6 degrees below normal during October, with many areas 8 degrees or more below normal. At Goodland, this was the coldest October of record with an average temperature of 43.7^{0}F. Topeka recorded its fourth coldest October; record low daily maximum temperatures were set on October 10, 11 and 15 and tied on the 13th.

The statewide average total precipitation during October was 3.77 inches, which was 173 percent of normal. Monthly totals ranged from 1.00 inches near Marienthal in Wichita County to 11.19 inches near Walnut in Crawford County. Based upon preliminary reports, Galesburg in Neosho County had received over 75 inches of precipitation through the first 10 months of 2009! If confirmed, this and any additional precipitation in November and December would establish a new Kansas record for most precipitation during a calendar year. Hiawatha holds the present record with 71.99 inches in 1973.

The U.S. Drought Monitor which does not presently show drought or abnormally dry conditions anywhere in the state.

CURRENT COUNTY DECLARATIONS

No county drought stage declarations issued by the Governor are presently in effect.

Presidential major disaster declarations affecting Kansas in 2009 are:

- FEMA-1848-DR (Severe winter storm; March 26 -29, 2009)
- FEMA-1849-DR (Severe storms, flooding, high winds and tornadoes; April 25 to May 16, 2009)
- FEMA-1847-DR (Severe storms, tornadoes and flooding; May 8 and May 16, 2009)
- FEMA-1853-DR (Severe storms, tornadoes and flooding; June 5 - 26, 2009)
- FEMA-1860-DR (Severe storms and flooding; July 8-14, 2009).

Up-to-date information regarding designated counties and assistance available due to these declarations is available here: http://www.fema.gov/dhsusda/index.jsp.

U.S. Secretary of Agriculture Tom Vilsack has made the following Primary Natural Disaster Area designations in Kansas:

- July 22, 2009 (8 counties) for losses due to excessive rain, flash flooding, flooding, high winds and freeze from March 27 – May 31, 2009, and
- August 29, 2009 (20 counties) for losses caused by heavy rain, flash flooding, high winds and hail from April 27 – July 8, 2009.
- November 6, 2009 (3 counties) for losses caused by high winds and hail from July 17 – September 3, 2009.

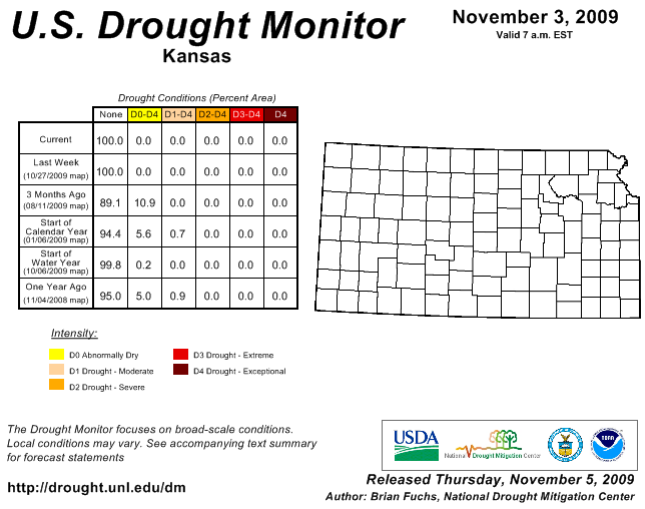
For additional information regarding these USDA designations, please see: http://www.rurdev.usda.gov/rd/disasters/.

DROUGHT MONITORING AND INDICES

The U.S. Drought Monitor is perhaps the most widely recognized drought monitoring tool in the nation. The Monitor (current map) is a composite of several observed weather variables and drought indices that is updated weekly. It is important to note that the Monitor is intended to provide a "big picture" perspective of conditions across the nation. It is not designed to show local conditions or to replace state and local-level monitoring efforts.

As was the case on September 29th, the November 3rd Monitor does not indicate the presence of drought or abnormally dry conditions anywhere in Kansas. During October, an area of abnormally dry conditions in southeast Nebraska just touched the Kansas border in Marshall and Washington counties. Recent rains have allowed the removal of this area from the map.

The table accompanying the map compares the percentage of the state currently affected by drought conditions with several points during the past year.



In the Kansas county drought stage scheme, a Drought Watch equates roughly to moderate drought in the U.S. Drought Monitor, while a Drought Warning is the equivalent of severe drought. A Drought Emergency is reserved for extreme or exceptional drought.

Palmer Drought Severity Index - The Palmer Index (PDSI) is an indicator used in the U.S. Drought Monitor. The statewide average PDSI for the week ending October 31st was 4.38 (extremely moist), up from the October 3rd value of 3.33 (very moist). Divisional PDSI values ranged from 2.95 (unusually moist) in the northeast to extremely moist values of 5.84 and 5.92 in the northwest and southeast, respectively.

October Conditions

October 2009 graph unavailable at publication time

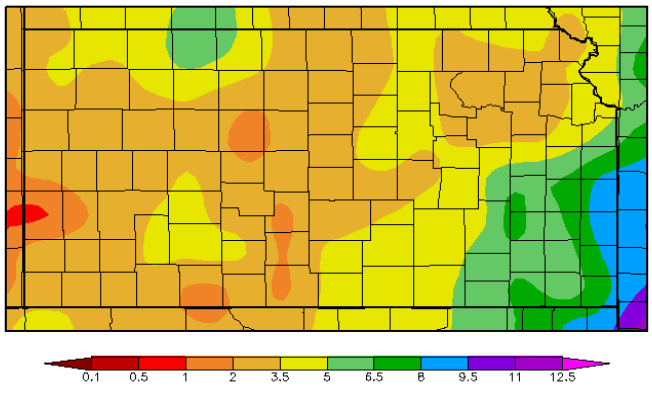
October 2009 ranks as the 13th wettest October on record (1895-2009) in Kansas with a statewide average total precipitation of 3.77 inches. This is 173 percent of normal. The graph at the left shows October precipitation in this long-term perspective. The monthly statewide moisture status graphs and rankings are available from the National Climatic Data Center.

Based on preliminary reports, the greatest total precipitation received in October at National Weather Service COOP network stations, was 11.19 inches at Walnut 3 S (Crawford County). Tops for the Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) during October was 9.73 inches at Farlington 2.8 ESE in Crawford County.

On the low end, Syracuse (Hamilton County) received only 1.03 inches of precipitation during October, the least reported by the state's NWS COOP observers. The driest among CoCoRaHS observers during October was Marienthal 10.5 N (Wichita County) where 1.00 inches fell.

The maps below show total precipitation received and the percent of normal across the state in October.

Precipitation (in)
10/1/2009 – 10/31/2009



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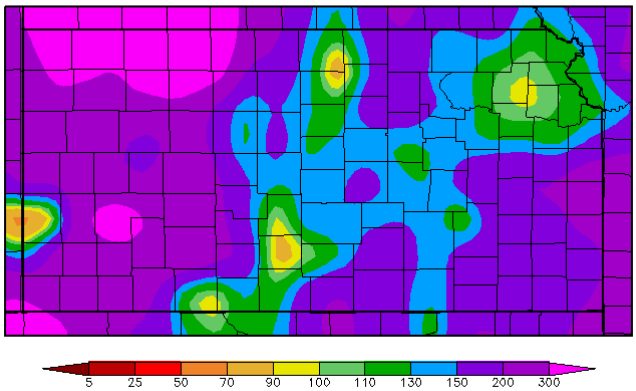
Percent of Normal Precipitation (%)
10/1/2009 – 10/31/2009

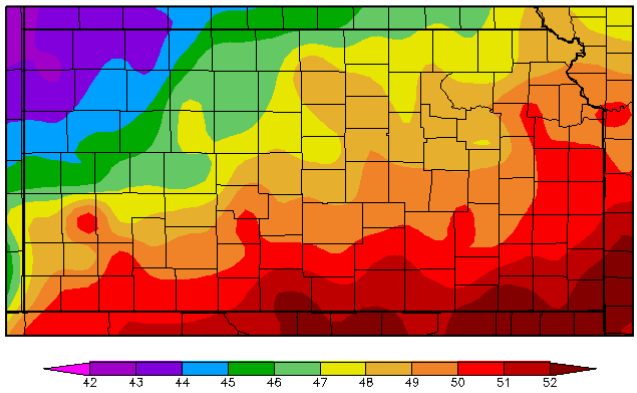


Generated 11/2/2009 at HPRCC using provisional data. NOAA Regional Climate Centers

The following maps show average monthly temperature and the departure from normal across Kansas during October. The statewide average temperature of 48.4^0 F was 7.8 degrees below normal. This was the 2nd coolest October of record (1895-2009) for Kansas. September 1925 was the coolest with a statewide average temperature of 46.9^{0}F.

Average monthly temperatures at individual reporting locations ranged from 42.7^{0}F at Goodland 19 SW (Sherman County) to 53.7^{0}F at Pittsburg (Crawford County). The highest temperature recorded in Kansas during October occurred on the 1st with 98^{0}F at Liberal (Seward County) and Ulysses 1 SE (Grant County). The coolest reading observed in the state during October was 18^{0}F at Goodland 19 SW on the 10th and at St. Francis (Cheyenne County) on the 11th. Kansas' statewide all-time record high temperature for October is 104^0 F at St. Francis in 1947; the record low temperature is -3^0 F at Wallace (Wallace County) in 1917.

Temperature (F)
10/1/2009 – 10/31/2009



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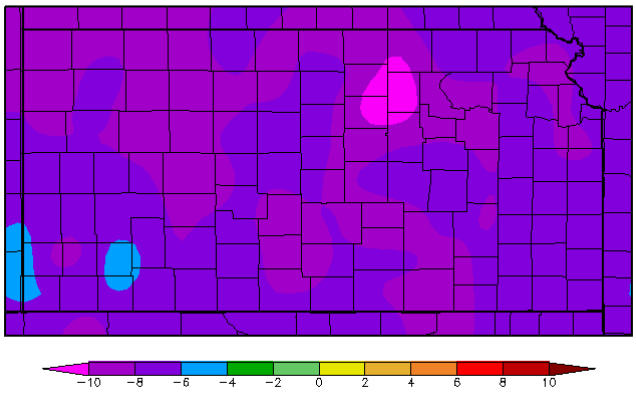
Departure from Normal Temperature (F)
10/1/2009 – 10/31/2009



Generated 11/5/2009 at HPRCC using provisional data. NOAA Regional Climate Centers

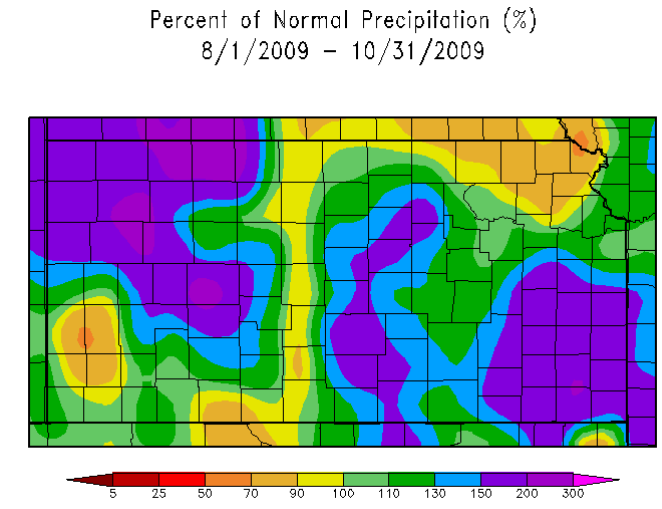
Table 1 summarizes October temperature and precipitation conditions by climate division while Appendix A provides an October summary for principal reporting locations within and adjacent to Kansas. Please note that the data used in compiling Table 1 and Appendix A is preliminary and comes from different sources. This may result in slight differences in the average or extreme values presented.

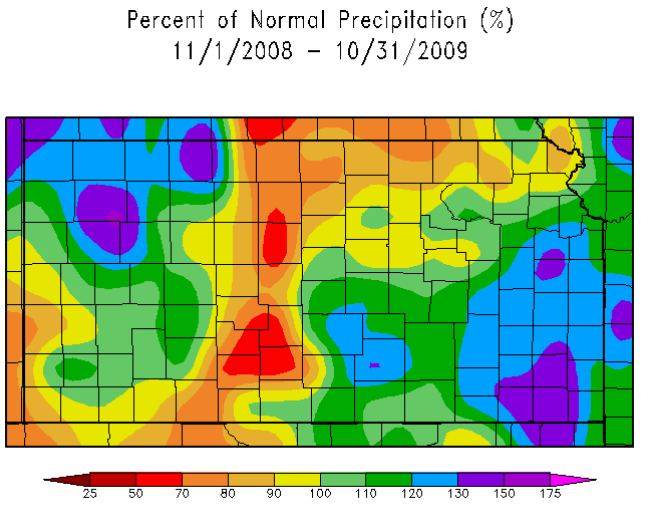
Table 1 October 2009 Kansas Climate Division Summary										
	Precipitation (inches)						Temperature (^{0}F)			
	October 2009			2009 Through October 31					Monthly Extreme	
Division	Total	Dep.[1]	% Norm	Total	Dep.[1]	% Norm	Average	Dep.[1]	Highest	Lowest
Northwest	3.69	2.49	308	25.46	6.48	134	44.0	-9.7	93	18
West Central	2.45	1.30	213	21.57	3.15	117	45.3	-9.2	93	20
Southwest	3.03	1.90	268	20.01	1.96	111	48.8	-8.0	98	24
North Central	3.13	1.19	161	23.53	-1.50	94	47.1	-8.7	87	22
Central	3.28	1.00	144	29.22	2.87	111	48.5	-9.0	87	21
South Central	3.55	1.31	158	32.09	6.34	125	49.6	-8.9	92	24
Northeast	3.51	0.53	118	34.65	2.56	108	48.5	-8.1	78	26
East Central	3.90	0.63	119	38.19	5.02	115	49.5	-8.1	78	29
Southeast	6.10	2.54	171	48.37	14.25	142	51.0	-8.1	84	28
STATE	3.66	1.48	168	30.35	4.75	119	48.0	-8.6	98[2]	18[3]

1. Departure from 1971-2000 normal value
2. State highest temperature reported from Ulysses 1SE (Grant County) and Liberal (Seward County)on the 1st.
3. State lowest temperature reported from Goodland 19 SW (Thomas County) on the 10th and from St. Francis (Cheyenne County) on the 11th.

Source: KSU Weather Data Library

Longer-Term Precipitation Trends - The following two maps show the percentage of normal precipitation received across Kansas during the past three months (August 2009 - October 2009) and during the past 12 months (November 2008 – October 2009).





So- far during 2009 (January through October), total precipitation received across Kansas has ranged from 13.62 inches (88% of normal) at Syracuse in Hamilton County to 75.59 inches (208% of normal) at Galesburg in Neosho County. If confirmed, Galesburg has broken the state record for most precipitation in a calendar year, which was 71.99 inches recorded at Hiawatha in 1973.

Radar-based precipitation estimate maps covering multiple time periods are available from the National Weather Service. These maps are updated daily. Monthly and annual individual station and county average precipitation data is available from the Weather Data Library at Kansas State University.

DROUGHT IMPACTS AND RESPONSE

Agriculture

The Kansas Crop and Weather Report is updated weekly during the growing season. Included is information about crop conditions and progress, soil moisture conditions, range and pasture conditions, hay and pasture supplies and stock water supplies.

The Report released November 2nd rated topsoil moisture as 2 percent short-very short, statewide, compared with 12 percent short-very short one month ago and 5 percent short-very short at this time last year. Topsoil moisture was shortest in the southwest district where 15 percent short-very short conditions were reported. Subsoil moisture was rated 7 percent short-very short, 77 percent adequate and 16 percent surplus, statewide.

Statewide, hay and forage supplies were rated 81 percent adequate, while feed grain supplies were rated 89 percent adequate. Stock water supplies were rated as 96 percent adequate-surplus.

Statewide crop conditions were summarized as follows for the week ending November 1st:

- Corn – 8 percent poor-very poor; 26 percent fair; 66 percent good-excellent
- Sorghum – 6 percent poor-very poor; 25 percent fair; 69 percent good-excellent
- Soybeans – 6 percent poor-very poor; 18 percent fair; 76 percent good-excellent
- Cotton – 21 percent poor-very poor; 40 percent fair; 39 percent good-excellent
- Sunflowers – 10 percent poor-very poor; 23 percent fair; 67 percent good-excellent
- Winter Wheat – 3 percent poor-very poor; 23 percent fair; 74 percent god-excellent

Range and pasture conditions were rated 10 percent poor-very poor, 28 percent fair and 62 percent good-excellent.

Streamflow and Reservoir Levels

The U.S. Geological Survey Kansas Drought Watch provides information on 7-day average streamflow measured at long-term gaging stations and how they compare to normal flows. Most of these gages are located in central and eastern Kansas. A map (click on National Drought Map and then on Kansas) identifies river basins experiencing below normal flows and hydrologic drought.

Seven-day average streamflow was below normal (<25th percentile) at 7 percent of Kansas' long-term gaging stations on October 31st; the September 30th value was also 7 percent. Normally about 25 percent of gages are below normal at any given time.

As of November 4, 2009, no streams were under minimum desirable streamflow (MDS) administration by the Kansas Department of Agriculture - Division of Water Resources. Flow in most streams was well above the MDS target level. The 60-day criteria for initiation of MDS administration was met at the Concordia gage on the Republican River as of Tuesday, November 3rd. However, diversions from the Courtland Canal ceased on November 4th and as a result flows have increased at Concordia.

Table 2 summarizes federal reservoir pool elevations on October 30, 2009 in terms of departure from the top of the conservation/multipurpose pool and pool elevation change since September 30th.

Table 2 Kansas Federal Reservoirs End-of-Month Pool Elevation Summary					
		Pool Elevation (Feet MSL)		10/30/2009	
Reservoir	Top MP/C Pool[1]	09/30/09	10/30/09	Departure from Top[2]	Change from 09/30/2009[2]
Kansas River Basin					
Norton	2304.3	2293.8	2294.2	-10.1	0.4
Harlan County, NE	1946.0	1943.6	1944.1	-1.9	0.5
Lovewell	1582.6	1576.9	1578.6	-4.0	1.7
Milford	1144.4	1146.1	1146.6	2.2	0.5
Cedar Bluff	2144.0	2127.1	2127.3	-16.7	0.2
Kanopolis	1463.0	1466.0	1462.7	-0.3	-3.3
Wilson	1516.0	1516.8	1516.9	0.9	0.1
Kirwin	1729.3	1729.9	1730.5	1.2	0.6
Webster	1892.5	1893.7	1894.3	1.8	0.6
Waconda	1455.6	1455.6	1455.9	0.3	0.3
Tuttle Creek	1075.0	1078.7	1078.0	3.0	-0.7
Perry	891.5	892.5	892.8	1.3	0.3
Clinton	875.5	877.2	877.9	2.4	0.7
Pomona	974.0	974.5	976.4	2.4	1.9
Melvern	1036.0	1036.5	1038.8	2.8	2.3
Hillsdale	917.0	917.3	919.0	2.0	1.7
Arkansas River Basin					
Cheney	1421.6	1422.0	1422.0	0.4	0.0
El Dorado	1339.0	1338.9	1339.6	0.6	0.7
Toronto	901.5	904.2	915.0	13.5	10.8
Fall River	948.5	951.3	959.5	11.0	8.2
Elk City	796.0	797.6	801.5	5.5	3.9
Big Hill	858.0	858.3	859.0	1.0	0.7
Council Grove	1274.0	1274.1	1275.3	1.3	1.2
Marion	1350.5	1350.5	1350.6	0.1	0.1
J. Redmond	1038.0	1040.3	1041.4	3.4	1.1

1. Seasonal pool operation at El Dorado, Toronto, Fall River, Elk City, Council Grove and John Redmond reservoirs.
2. All values are in feet. Negative departures or changes are shown in red.

Source: U.S. Army Corps of Engineers

Public Water Systems

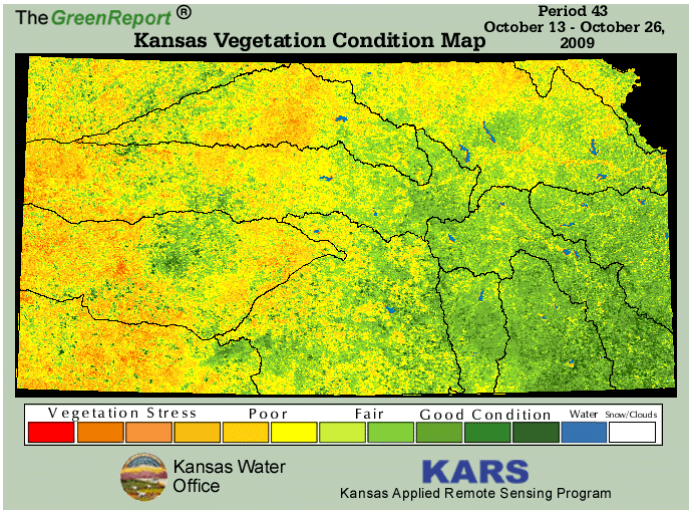
No drought-related public water system impacts are currently being reported.

Several publications provide guidance regarding drought preparedness and response. The 2007 Municipal Water Conservation Plan Guidelines replace previous guidelines dating back to 1990. These guidelines cover drought response in addition to long-term water conservation.

The Drought Vulnerability Assessment Report identifies those systems most likely to first be impacted by drought and the reason for their vulnerability. It was updated in 2007 to reflect system conditions as of 2006.

Responding to Drought: A Guide for City, County and Water System Officials provides an overview of Kansas county drought stage declarations, local planning and coordination, disaster declarations, and available state and federal assistance.

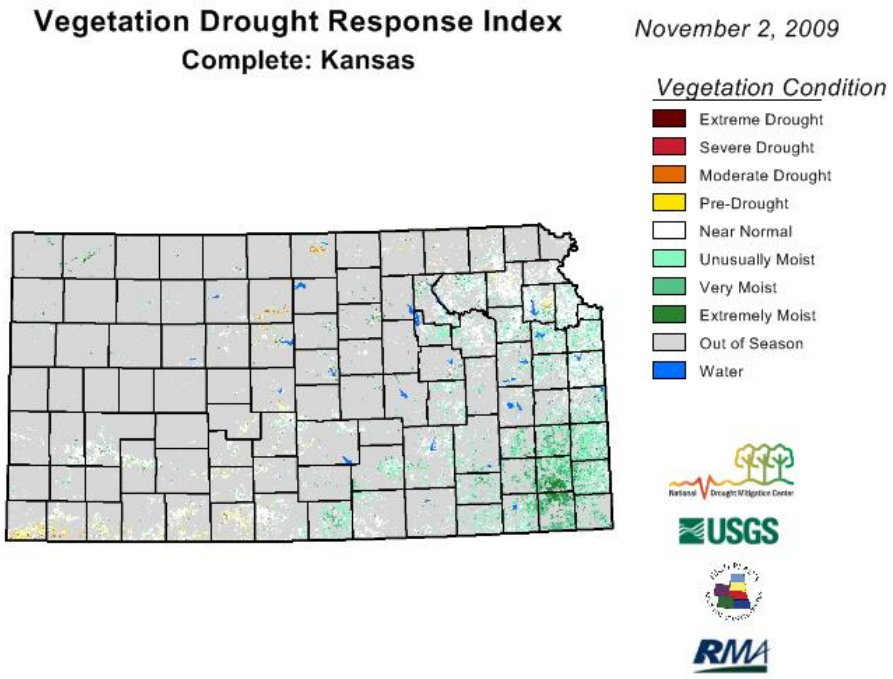
Vegetation Conditions



The Kansas Applied Remote Sensing Program (KARS) at the University of Kansas produces a Kansas Green Report each week during the growing season. This report consists of a set of five interactive maps derived from satellite and historic data that illustrate vegetation conditions and crop progress across the state.

The Vegetation Condition Index Map, included in the Green Report, illustrates vegetation health and levels of plant stress based on current and historic vegetation greenness and surface temperatures. The map for the two-week period ending October 26th (see left) reflects the fact that the growing season is winding down and is the last such map for the 2009 season.

The Vegetation Drought Response Index (VegDRI) provides another perspective on vegetation conditions across the state. VegDRI attempts to isolate the impact of drought or other moisture conditions from other factors that influence vegetation condition.



The November 2nd map (see right) indicates moist conditions in southeast Kansas and the end of the growing season elsewhere in the state.

The VegDRI map is updated on a bi-weekly basis.

Wildfire

No large wildfires were reported to the Kansas Forest Service in October. Wildfires burning at least 300 acres in grass or 100 acres in timber are considered large.

The Wildland Fire Outlook issued by the National Interagency Fire Center on November 2nd foresees near normal significant wildfire potential across Kansas during the November – February period. Significant fire potential is defined as the likelihood that a wildfire will require mobilization of additional resources from outside the area in which the fire originated.

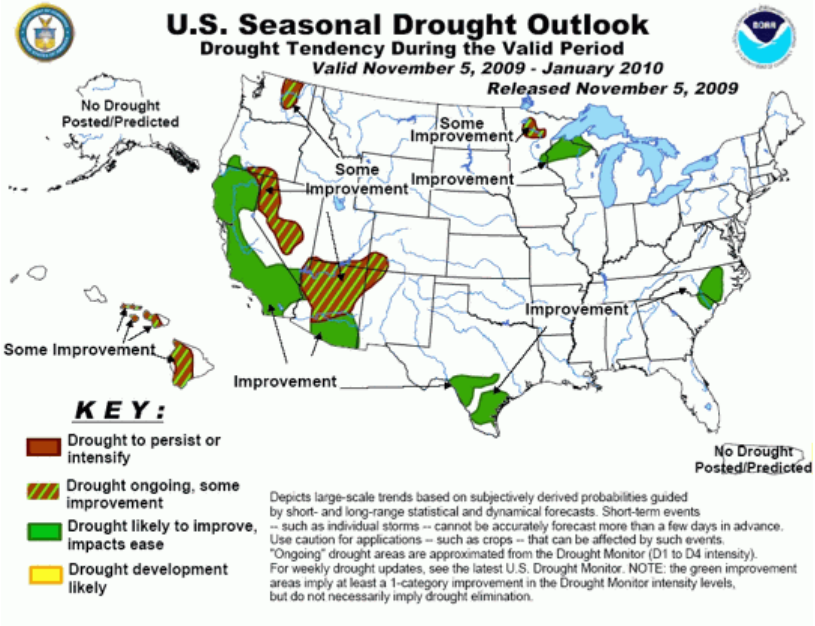
The National Weather Service provides a full range of fire weather products and services for Kansas. Included are the Rangeland Fire Danger Index, Fire Weather Forecasts, Red Flag Watches/Warnings, and Spot Forecasts. Each NWS office serving Kansas has these products available on its website. These websites may be accessed from this county warning and forecast area map. Clicking on one of these

areas takes you to that NWS Office's home page. Look for "Fire Weather" in the menu on the left margin of the page.

Fire weather links are also available from the Weather Data Library at Kansas State University, as are prescribed burning guidance publications.

LOOKING AHEAD

The Seasonal Drought Outlook, developed by the NOAA Climate Prediction Center (NOAA CPC), assesses the likelihood for improvement, persistence or deterioration in drought conditions for areas currently experiencing drought as identified by the U.S. Drought Monitor. The Outlook released November 5th for the period through January 2010 (see below) indicated that development of drought conditions in Kansas or elsewhere in the nation is unlikely.



ADDITIONAL INFORMATION

The Kansas Climate Summary and Drought Report is compiled by the Kansas Water Office from various federal, state, local and academic sources. The report summarizes conditions at the end of the month indicated. Some data used is preliminary and is subject to change when final data is available at a later date.

The Kansas Water Office web site, KWO Drought, contains additional drought information including links to other agencies with drought information and past issues of the Kansas Climate Summary and Drought Report. The Operations Plan for the Governor's Drought Response Team is also available here.

Please contact Susan Metzger at the KWO (785/296-1007) or susan.metzger@kwo.ks.gov, should you have any questions or suggestions.

Appendix A

October 2009
Kansas Regional Climate Summary

	Precipitation (inches)			Temperature (^{0}F)			
						Extreme (Date)	
Station	Total	Departure[2]	Percent Normal	Mean	Departure[2]	Highest	Lowest
(West)							
Burlington, CO[1]	4.05	3.14	445	42.5	-8.8	85 (18)	18 (10)
Dodge City[1]	3.85	2.40	266	49.1	-8.0	83 (20)	26 (10)
Garden City[1]	3.17	2.23	337	47.9	-7.9	83 (20)	25 (10)
Goodland[1]	2.79	1.74	266	43.7	-8.1	83 (18)	20 (10)
Guymon, OK[1]	2.71	1.51	226	51.2	-6.7	91 (19, 20)	28 (23, 30)
Hill City[1]	3.36	2.03	253	47.1	-6.9	82 (19)	25 (10)
Lamar, CO[1]	0.19	---	---	46.4	---	87 (18, 19)	19 (30)
McCook, NE[1]	3.89	2.61	304	44.3	-8.6	81 (18)	22 (10)
Springfield, CO[1]	3.31	---	---	47.8	---	87 (19)	22 (30)
(Central)							
Concordia[1]	2.77	0.93	151	48.3	-7.7	76 (20)	27 (10)
Hebron, NE[1]	M	M	M	47.1	-6.0	75 (19, 20)	27 (10)
Medicine Lodge[1]	2.97	0.63	127	51.8	-6.1	78 (20)	31 (27)
Ponca City, OK[1]	5.13	---	---	53.6	-7.6	80 (20)	32 (27)
Salina[1]	3.40	0.85	133	49.2	-8.7	75 (20)	31 (24, 27)
Wichita (ICT)[1]	3.82	1.37	156	51.2	-7.4	76 (20)	31 (27)
(East)							
Bartlesville, OK[1]	7.02	3.51	200	53.9	-7.7	84 (1)	29 (18)
Chanute[1]	7.29	3.26	181	51.6	-6.8	79 (1)	31 (18)
Falls City, NE[1]	3.34	0.75	129	48.3	-6.7	72 (19)	28 (10)
Johnson Co. Exec. Apt.[1]	5.44	1.96	156	50.1	-8.1	74 (1)	32 (18)
Joplin, MO[1]	8.88	4.94	225	52.9	-6.6	83 (1)	31 (18)
Kansas City (MCI), MO[1]	3.66	0.33	110	50.6	-6.2	76 (1)	31 (18)
St. Joseph, MO[1]	4.25	0.97	130	48.9	-7.8	72 (19)	28 (18)
Topeka (TOP)[1]	3.13	0.14	105	50.6	-6.0	77 (20)	29 (18, 27)

1. Airport Automated Observation Stations (NWS/FAA)
2. Departure from 1971-2000 normal value

T – trace; M – missing data; - - - no normal value from which to calculate departure or percent of normal

Source: : National Weather Service F-6 Climate Summaries